

WHAT IS CLAIMED IS:

1. A microscope assemblage, in particular for confocal scanning microscopy, comprises a light source (1) for illuminating a specimen (6), at least one fluorescent-light detector (11, 14) for the detection of fluorescent light (10, 13) generated in the specimen (6) and at least one transmitted-light detector (16) for the detection of transmitted light (15) passing through the specimen (6), wherein the fluorescent-light and transmitted-light detectors (11, 14; 16) are arranged to enable simultaneous detection of fluorescent and transmitted light (10, 13; 15).
2. The microscope assemblage as defined in Claim 1, characterized in that the specimen (6) defines a top side (6a) facing the light source (1) and a bottom side (6b) facing away from the light source (1) and least one fluorescent-light detector (11, 14) is arranged on the side of the specimen (6) facing away from the light source (1).
3. The microscope assemblage as defined in Claim 2, characterized in that at least one transmitted-light detector (16) is arranged on the side of the specimen (6) facing away from the light source (1).
4. The microscope assemblage as defined in Claim 3, characterized in that a condenser (7) for the transmitted light (15) and the fluorescent light (10, 13) is arranged on the side of the specimen (6) facing away from the light source (1).
5. The microscope assemblage as defined in Claim 4, characterized in that an objective (5) is arranged between the light source (1) and the specimen (6) and the aperture of the condenser (7) is larger than the aperture of the objective (5).

6. The microscope assemblage as defined in Claim 5, characterized in that the transmitted light (15) and the fluorescent light (10, 13) are divisible on the side of the specimen (6) facing away from the light source (1), after passing through the condenser (7).
7. The microscope assemblage as defined in Claim 6, characterized in that at least one color beam splitter (9, 12) is used to provide light to at least one fluorescent-light detector (11, 14).
8. The microscope assemblage as defined in Claim 6, characterized in that a multiband detector is used for spectral separation.
9. The microscope assemblage as defined in Claim 1, characterized in that the fluorescent light (10, 13) and transmitted light (15) are detectable in one detector.
10. The microscope assemblage as defined in Claim 1, characterized in that the fluorescent light (10, 13) and transmitted light (15) are detectable in different detectors (11, 14; 16).
11. The microscope assemblage as defined in Claim 2, characterized in that a scanning device (4) is arranged on the side of the specimen (6) facing toward the light source (1).
12. A microscope assemblage, in particular for confocal scanning microscopy, comprises: a light source (1) for illuminating a specimen (6), at least one fluorescent-light detector (11, 14) for the detection of fluorescent light (10, 13) generated in the specimen (6); at least one transmitted-light detector (16) for the detection of transmitted light (15) passing through the specimen (6),

wherein the fluorescent-light and transmitted-light detectors (11, 14; 16) are arranged to enable simultaneous detection of fluorescent and transmitted light (10, 13; 15) and a first polarization device is provided between the light source (1) and the specimen (6), a second polarization device is provided after the specimen (6).

13. The microscope assemblage as in Claim 12, characterized in that the first polarization device is provided before the objective (5), and the second polarization device is provided after the condenser (7).
14. The microscope assemblage as defined in Claim 13, characterized in that the polarization devices are prisms (18).
15. The microscope assemblage as defined in Claim 14, characterized in that the prisms (18) are Wollaston prisms.
16. The microscope assemblage as defined in Claim 12, characterized in that the specimen (6) defines a top side (6a) facing the light source (1) and a bottom side (6b) facing away from the light source (1) and at least one fluorescent-light detector (11, 14) is arranged on the side of the specimen (6) facing away from the light source (1).
17. The microscope assemblage as defined in Claim 16, characterized in that at least one transmitted-light detector (16) is arranged on the side of the specimen (6) facing away from the light source (1).
18. The microscope assemblage as defined in Claim 17, characterized in that a condenser (7) for the transmitted light (15) and the fluorescent light (10, 13) is arranged on the side of the specimen (6) facing away from the light source (1).

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19. The microscope assemblage as defined in Claim 18, characterized in that an objective (5) is arranged between the light source (1) and the specimen (6) and the aperture of the condenser (7) is larger than the aperture of the objective (5).
20. The microscope assemblage as defined in Claim 19, characterized in that the transmitted light (15) and the fluorescent light (10, 13) are divisible on the side of the specimen (6) facing away from the light source (1), after passing through the condenser (7).
21. The microscope assemblage as defined in Claim 20, characterized in that at least one color beam splitter (9, 12) is used to provide light to at least one fluorescent-light detector (11, 14).
22. The microscope assemblage as defined in Claim 20, characterized in that a multiband detector is used for spectral separation.
23. The microscope assemblage as defined in Claim 12, characterized in that the fluorescent light (10, 13) and transmitted light (15) are detectable in one detector.
24. The microscope assemblage as defined in Claim 12, characterized in that the fluorescent light (10, 13) and transmitted light (15) are detectable in different detectors (11, 14; 16).
25. The microscope assemblage as defined in Claim 12, characterized in that a polarization filter (19) is arranged before the transmitted-light detector (16).

26. The microscope assemblage as defined in Claim 12, characterized in that an optical system is arranged in the beam path wherein the optical system consists essentially of a sector optical system, a sector polarization optical system, a sector stop (20), a sector phase stop and a sector phase filter
27. The microscope assemblage as defined in Claim 26, characterized in that the optical system is arranged in a Fourier plane of the beam path.
28. The microscope assemblage as defined in Claim 27, characterized in that the optical system, is arranged in the Fourier plane immediately before the transmitted-light detector (16).
29. A microscope assemblage, in particular for confocal scanning microscopy, comprises: a light source (1) for illuminating a specimen (6), at least one fluorescent-light detector (11, 14) for the detection of fluorescent light (10, 13) generated in the specimen (6), wherein the specimen (6) defines a top side (6a) facing the light source (1) and a bottom side (6b) facing away from the light source (1), at least one transmitted-light detector (16) for the detection of transmitted light (15) passing through the specimen (6), and an additional light source (21) being arranged on the side of the specimen (6) facing away from the light source (1).
30. The microscope assemblage as defined in Claim 29, characterized in that the additional light source (21) is a white light source.
31. The microscope assemblage as defined in Claim 29 , characterized in that an optical system, which consists essentially of a sector optical system, a sector polarization optical system, a sector stop (20), a sector phase stop and a sector phase filter, is associated with the additional light source (21).

32. The microscope assemblage as defined in Claim 31, characterized in that the optical system is arranged in the Fourier plane before the additional light source (21).
33. The microscope assemblage as defined in Claim 29, characterized in that at least one transmitted-light detector (16) is arranged on the side of the specimen (6) facing away from the light source (1).
34. The microscope assemblage as defined in Claim 33, characterized in that a condenser (7) for the transmitted light (15) and the fluorescent light (10, 13) is arranged on the side of the specimen (6) facing away from the light source (1).
35. The microscope assemblage as defined in Claim 34, characterized in that an objective (5) is arranged between the light source (1) and the specimen (6) and the aperture of the condenser (7) is larger than the aperture of the objective (5).
36. The microscope assemblage as defined in Claim 35, characterized in that the transmitted light (15) and the fluorescent light (10, 13) are divisible on the side of the specimen (6) facing away from the light source (1), after passing through the condenser (7).
37. The microscope assemblage as defined in Claim 36, characterized in that at least one color beam splitter (9, 12) is used to provide light to at least one fluorescent-light detector (11, 14).
38. The microscope assemblage as defined in Claim 36, characterized in that a multiband detector is used for spectral separation.

39. The microscope assemblage as defined in Claim 29, characterized in that the fluorescent light (10, 13) and transmitted light (15) are detectable in one detector.
40. The microscope assemblage as defined in Claim 29, characterized in that the fluorescent light (10, 13) and transmitted light (15) are detectable in different detectors (11, 14; 16).
41. The microscope assemblage as defined in Claim 29, characterized in that a scanning device (4) is arranged on the side of the specimen (6) facing toward the light source (1).
42. The microscope assemblage as defined in Claim 29, characterized in that at least one detector is arranged on the side of the specimen (6) facing toward the light source (1), preferably on the side of the scanning device (4) facing away from the specimen (6).
43. The microscope assemblage as defined in one of Claims 29, characterized in that the light source (1) is a laser.